

closer scrutiny, however, MCI's capturing of scale economies would be not in tandem with but at the expense of broad PCS participation. An MCI spokesman recently revealed that each national consortium would have "five, 15, or 20 companies involved."⁷⁸ This minimal level of involvement combined with the fact that the consortia themselves would self-select their participants would preempt many firms from PCS participation. Such exclusion, achieved by private parties' self-interested selections rather than through a competitive market structure, risks inefficient outcomes, reducing consumer welfare.⁷⁹ In effect, MCI seeks to solve the Commission's licensing "problem" by delegating the task to three private entities which would then engage in supervised market division.

Further, there is no reason to believe that PCS scale economies are so large as to warrant national licensing and the concomitant sacrifice to competition and diversity. The Commission has refused to make such assumptions in analogous

⁷⁸ Multichannel News, statement of Jim Collins, at 56 (November 16, 1992).

⁷⁹ In a similar vein, MCI's suggestion that each consortia "require its local operators to offer a uniform floor of basic services to its customers" (MCI at 10) undermines the Commission's decision to "adopt a PCS regulatory structure that allows ... flexibility in implementing new services and technologies." Notice at ¶ 24. It also increases the risks involved in a "wrong" decision about technology or services.

circumstances,⁸⁰ and the OPP Cost Study refuses to do so here as well.⁸¹

Nor will three national consortia somehow facilitate the emergence of PCS standards or guarantee regional interoperability. Indeed, there is every reason to assume that multiple national consortia would actually forestall such interoperability. For example, Sirbu and Stewart have linked the emergence of voluntary standards to market structure. They found the presence of decentralized providers and unrelated buyers actually provides the optimal structure for the emergence of a single industry standard.⁸² According to this model, because PCS is targeted for the mass-market (or unrelated buyers), opportunities for a single standard improve with an increasing number of PCS licenses. The OPP Cost Study cited the Sirbu/Stewart model in rejecting national PCS licensing:

Nationwide PCS licenses could decrease
incentives for interoperability and common

80 See, e.g., Land Mobile Use of 806-960 MHz Band, 42 F.C.C. 2d 957, 959 (1973) ("The mobile telephone service market does not appear to exhibit strong natural monopoly features, and there is no conclusive information as to whether there are economies of scale sufficiently to justify a policy commitment to a single system or a particular technology.").

81 OPP Cost Study at 48.

82 Marvin Sirbu and Steven Stewart, Market Structure and the Emergence of Standards, Department of Engineering and Public Policy, Carnegie Mellon University, Pittsburgh, PA 15213 (1986).

standards because of the smaller number of centralized providers, each of which would attempt to implement its own standard. In contrast, smaller service areas would increase the number of PCS licensees and create more incentives for the decentralized providers to agree upon common standards.⁸³

Further, any national networking efficiencies can be captured through contracts between and among local service providers and third parties, as evidenced in the experiences of television, radio, and cellular.⁸⁴

In the hopes of legitimizing the use of national consortia for PCS, one of the commenters, dbX Corporation, cites prior FCC decisions in which national licensing has been

83 OPP Cost Study at 48. Similarly, MCI's claim that national consortia would make PCS more competitive internationally (MCI at 12) is equally suspect in that the imposition of inefficient PCS technologies by such consortia would actually subvert rather than enhance U.S. competitiveness in the international PCS arena.

84 See AT&T at 12 ("Although the Commission has suggested that a nationwide serving area for PCS licensees may offer certain advantages, such benefits -- including nationwide roaming capabilities, nationwide technical standards, and reduction of interference cost -- could also be achieved without sacrificing service providers or diversity."). Accord, DOJ at 18-19; Nynex Corporation at 21-22; Rock Hill, Fort Mill, and Lancaster Telephone Companies at 5.

Indeed, to the extent PCS does not develop into regional or nationwide services, such premature government imposition of roaming standards will significantly increase PCS startup costs unnecessarily.

authorized or proposed.⁸⁵ The references are decidedly inapposite in the PCS context. Most of the cited decisions involve established industries which had demonstrated a clear demand for nationwide licensing to which the Commission merely responded. For example, in its decision to establish nationwide set asides in the narrowband private land mobile radio services, the Commission made it clear that it was responding to "[d]evelopments in recent years demonstrat[ing] a growing demand for nationwide land mobile services."⁸⁶ Similarly, the Commission's proposal to set aside specific blocks of channels for national 900 MHz SMR networks was predicated on its extensive review of the SMR industry and its conclusion that "[w]ide area service seems to be a service the public demands."⁸⁷ In the remaining precedents cited by dbX, national licensing was adopted simply because the very nature of the service was, by definition, national in scope.⁸⁸

85 dbX Corporation at 8 (citing Commission proceedings in the following service areas: narrowband private land mobile radio, Digital Termination Systems, paging, automatic train control system, and SMR).

86 Amendment of Part 90 of the Commission's Rules to Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Services, 6 FCC Rcd 2356, 2361 (1991).

87 Specialized Mobile Radio, 4 FCC Rcd 8673, 8675 (1989).

88 See, e.g., Advanced Train Control, 3 FCC Rcd 427 (1988)(nationwide licenses authorized for creation of advanced train control system, to automate nationwide rail operations); Digital Termination Systems, 86 F.C.C.

(Footnote continued on page 43)

In contrast, the types of PCS services that may ultimately develop and the nature of consumer demand for such services are essentially "unknowable" at this time. Curiously enough, neither dbX nor any national consortia proponent cites to the one Commission decision whose discussion of national licensing is closest to the point:

Although a nationwide, standardized mobile telephone system, dependent upon a particular technology, might well come to supplement the nationwide public message telephone system, no need has been adequately demonstrated for immediate commitment to or implementation of such a system.... In a period of rapid technological change, there are significant risks attendant to a commitment of a substantial portion of spectrum to a particular technology (however innovative it may presently appear) for the provision of mobile telephone service on a nationwide basis. Such a commitment could unduly inhibit further technological development and impede the growth of mobile telephone services.⁸⁹

* * *

For the foregoing reasons, the Commission should reject the use of national PCS licensing in any of its forms. Instead, it should look to the numerous benefits inherent in the well-established, highly customized MSAs/RSAs and heed the recommendations of the great majority of commenters who propose

88 (Footnote continued)

2d 360 (1981) (nationwide licensing adopted for DEMS networks because extensive studies indicated a market demand for intercity digital communications transmission for widely dispersed businesses and governments).

89 Land Mobile Use of 806-960 MHz Band, 42 F.C.C. 2d at 959.

the use of these service areas for PCS. If, in fact, any aspect of PCS ultimately develops into a regional or even nationwide service, market forces and the implementation of common air interface standards will facilitate interoperability and forge the appropriately sized networks to accommodate such services at that time.

C. The Use of Service Areas Other Than MSAs/RSAs
Would Be Arbitrary and Capricious if Accompanied
By the Exclusion of Current Cellular Providers
from PCS.

A minority of commenters would have the Commission drive this proceeding directly into collision with the reasoned decisionmaking requirements of the Administration Procedure Act. Arguments proposing agency action to: 1) exclude cellular companies from providing PCS service in their service areas and 2) defining PCS service areas in any way other than matching cellular licensing areas, would result in reversible error. Plainly, a mismatch in cellular and PCS licensing areas under such conditions would be arbitrary and capricious.

A single cellular MSA/RSA may partially overlap several PCS service areas. Exclusion of current cellular licensees from providing PCS in their cellular areas would therefore concomitantly exclude these cellular licensees from PCS eligibility in wide-ranging areas totally unrelated to the area of cellular service. BellSouth provides a concrete example of the arbitrary effects generated by this service area mismatch:

RSA 402, Illinois 9 - Clay, has a population of 150,000, and a cellular licensee in this RSA would be excluded from four MTAs (Chicago, Louisville, St. Louis, and Indianapolis) with a population totaling 23,365,800, covering 348 counties in seven states. Such a result could hardly be considered rational.⁹⁰

Such arbitrary exclusion would be repeated to some degree in virtually every geographic "market" nationwide. For each location in which a cellular operator would be excluded not because it is the cellular operator servicing that area but rather because it provides cellular service "nearby," a waiver would be required to make the rules rational and lawful. Creating a structure which requires the Commission to engage in costly, repetitive waiver proceedings would cause the very delays the Commission seeks to avert.

CONCLUSION

CTIA commends the Commission's efforts to facilitate expansion and innovation in the provision of wireless communications through the licensing of PCS services. CTIA respectfully submits that the Commission should adopt flexible regulatory policies for PCS, based on the principles set forth

⁹⁰ BellSouth at 36-37. See also Cellular Communications at 20; CTIA at 57-58.

in CTIA's comments. Such a flexible regulatory approach, through reliance on market forces rather than governmental fiat, will best promote the Commission's stated goals.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Michael F. Altschul" and "Michele C. Farquhar".

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January 8, 1993

The Cellular Service Industry: Performance and Competition

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Prepared on Behalf of the Cellular Telecommunications Industry
Association

The Performance of the Cellular Industry

From its beginning, the business of supplying cellular telephone communications has been characterized by rapidly increasing volume, declining prices, expanded service offerings, and significant technological change.

The volume of cellular services can be measured either by the number of subscribers or by the minutes of airtime used. The number of cellular telephone subscribers had grown from only 91,600 in January 1985 to an estimated 8.8 million by June 1992. Growth has continued to be rapid, with the number of cellular subscribers increasing by 46 percent during the 12 months ending June 1991 and by 39 percent in the 12 months ending June 1992.¹ The number of cellular subscribers is projected to be 19 million by 1995 and 38 million by 2001.² Growth in cellular airtime also has been substantial, although it has been slower than the growth in the number of subscribers because later subscribers have tended to use the service less intensively than earlier adopters. This change reflects the increased importance of residential users of cellular telephones relative to business users.

¹Cellular Telecommunications Industry Association, Industry Data Survey, June 30, 1992, p. 1. The growth in volume that has occurred has far exceeded expectations. When commercial cellular service began in the United States in 1983, the potential demand in the year 2000 was thought to be between one and two million subscribers; see Coopers & Lybrand, Technological Change and the Cellular Telecommunications Industry (November 1991), p. 15.

²Linden Corporation, Cellular Network Technology, End User Requirements, and Competition to the Year 2001, 1991, p. 244.

Contributing to this increasing volume has been a steady decline in the costs of owning and using cellular telephones. For example, the nominal price for 250 minutes of prime airtime usage per month across the ten largest cellular service areas had, in 1989, declined by 19 percent from the inception of commercial cellular service in 1983. Even with a slight increase in carrier charges estimated for 1991 and 1992, the unweighted average of the lowest published rate for access and 250 minutes of usage during prime time in these ten service areas was only 85 percent of its 1983 level. When adjusted for inflation, the average of these rates in the ten largest cellular service areas in 1991 was only 62 percent of its 1983 level.³

The monthly cost of a mobile cellular telephone has declined by even more than carrier charges, from \$79 in 1983 to \$7 in 1991. During the same time, the quality of mobile telephone service was also enhanced by improvements in functions and features. When adjusted for inflation, the total cost of owning and using a cellular telephone in 1991 was only 44 percent of its cost in 1983.⁴

Cellular subscribers have benefitted not only from falling prices but also from the continually expanding variety of services offered by cellular operators. Only five years ago, there were no

³Data are from Herschel Shosteck Associates, Ltd., Cellular Market Forecasts, Data Flash, September 1992.

⁴Data are from Shosteck, op. cit., and measure the "drive away" price of a single mobile telephone, including antenna, installation, and first-year maintenance.

value-added cellular services. Today, cellular providers offer a number of information services as well as features such as voice mail, call forwarding, and call waiting. There have been major advances in data transmission as well, including portable facsimile and wireless transmission for laptop computers. New services continue to be developed. For example, cellular telephones now are being used to verify credit cards and to transmit information to and from remote locations in computerized monitoring and reporting systems.

Technological advances in recent years also have enabled cellular systems to expand their capacity. Several capacity-increasing innovations have occurred in the conventional or analog cellular technology, such as adjusted power output, antenna tilting, dynamic channel assignment, and cell repeaters and umbrella (underlay/overlay).⁵

Notwithstanding the continuing improvements in analog-based cellular systems, even more dramatic advances are expected from the further development and application of digital technology. Virtually all cellular switches made today are digital, and the shift to this technology is expected to occur in base station radios and subscriber telephones during the 1990s.⁶

⁵H. Shosteck, "The question marks over PCNs," Mobile Europe, January 1991, no pagination.

⁶Coopers & Lybrand, op. cit., pp. 59-60. During a transition period, cellular phones will be dual mode, adaptable to both digital and analog systems.

The conversion to digital technology, despite the substantial investment required, promises to yield even greater increases in system capacity and lower average costs for cellular operators. For example, the capacity of base stations will at least triple initially. In addition, digital technology will permit new services to be provided.⁷

Competition in the Supply of Cellular Services

This performance of the cellular service industry is the kind that economists associate with a young industry driven by market forces and developing in a competitive context,⁸ and it has occurred without the industry's having a competitive structure, as economists define that term.⁹ The FCC has determined that the cellular service business should be a structural duopoly: only two facilities-based suppliers, one wireline carrier and one nonwireline carrier, are permitted to operate in a service area, with additional facilities-based entry barred. Economists have recognized, however, that the behavior of firms and the performance of an industry can approximate the competitive outcome even if the

⁷Ibid., p. 60.

⁸While this record of performance is consistent with a competitive industry, it does not prove that the industry is necessarily competitive, since even a monopolist facing conditions of increasing demand and reduced costs is likely to earn greater profits by lowering price, expanding output, and making innovations in products and methods of production.

⁹Economists call a market structure competitive when entry is easy, firms are numerous, and no firm has a large market share. As we point out in the text, the performance of a market can be competitive even if its structure is not.

industry does not consist of a large number of firms, none of which serves a large share of the market.

Economists consider the number and size distribution of firms in a market to be important initial indicators of the likelihood of noncompetitive behavior.¹⁰ Collusive arrangements, whether explicit or tacit, are more likely when there are only a few firms, simply because coordination is easier. Similarly, the costs of monitoring the behavior of others and enforcing any collusive arrangement by punishing "cheaters" are lower when there are few industry participants.¹¹ The size distribution of firms also affects the ease of coordination. A small number of very large firms may serve as coordinators in an industry that also includes many small firms.

However, economists also recognize that the competitive outcome, where prices are driven to marginal costs, may obtain even in industries with as few as two firms.¹² Theoretical models of the strategic interactions between duopolists predict a broad range of outcomes, from monopolistic to perfectly competitive.¹³ In

¹⁰M. Spence, "Tacit Co-ordination and Imperfect Information," Canadian Journal of Economics XI (1978), pp. 497 and 499.

¹¹J.S. Bain, "Relation of Profit Rate to Industry Concentration," Quarterly Journal of Economics LXV (1951), pp. 205-206.

¹²The best-known model demonstrating this result is found in J. Bertrand, "Théorie Mathématique de la Richesse Sociale," Journal des Savants, 1883, pp. 499-508.

¹³A large body of economic literature, predicting a range of competitive outcomes, is reviewed in J. Tirole, The Theory of Industrial Organization (Cambridge, MA: The MIT Press, 1988), pp. 225-308.

these models, firms choose whether to cooperate and at which price. The outcome depends on the reaction that each firm expects from its competitor to changes in its own price or output. This, in turn, determines the gains that each firm expects from undercutting a noncompetitive price, and the expected cost of being punished if such deviation is detected. Even duopolists do not necessarily react to each other's actions in ways that maximize joint profits: a duopoly is not the same as a monopoly.

The decision rules that comprise a firm's competitive strategy are difficult to infer from its observed behavior. Nonetheless, economists have identified a number of significant factors, in addition to the number of its rivals, that influence the strategies each firm pursues, and thus help to determine how close to the competitive outcome the industry's performance will be.¹⁴ These are factors that make collusive practices more or less difficult to establish, and affect the ease with which deviations from a collusive outcome can be detected and punished. Several of these factors are likely to influence the performance of the cellular service industry, albeit to varying degrees.

One of the most striking features of the mobile communication industry is the rapid pace of technological innovation and diffusion. Transmission technology has evolved from analog to digital, and cellular telephones have become truly portable, shrinking to pocket size. The rate of technological change and the

¹⁴G. J. Stigler, "A Theory of Oligopoly," Journal of Political Economy 74 (1964), pp. 44-61.

resulting speed with which the customer base is growing are two influences that economists consider procompetitive.

The rapid technological change in the provision of cellular service imparts a high degree of variability to the services offered and the prices of those services. In these circumstances, a collusive agreement is difficult to maintain, because the price of each new service must be integrated into the existing price structure.¹⁵ As providers adopt new technologies, the introduction of new service packages offers opportunities to "cheat" on a noncompetitive agreement without provoking the "punishment" that might otherwise occur, because it is difficult for a rival to determine what the appropriate price of the new service should be. If new services are offered at more competitive prices, because it is easier to deviate from a collusive agreement when products are changing, or even if rivals only perceive that the new services are being offered at prices that are "too low" because they do not know what those prices should be, a collusive agreement may be difficult to establish and maintain.

The rapid rate of technological innovation not only hinders the smooth functioning of a collusive pricing agreement but, by leading to rapid market growth, also may weaken the incentive for firms to participate in such agreements. When markets are growing

¹⁵R.A. Posner, Antitrust Law: An Economic Perspective (Chicago, IL: The University of Chicago Press, 1976), pp. 59-60.

rapidly, demand tends to be more inelastic, so the gains from deviating from a collusive price are greater.¹⁶

The importance of technological innovation in the provision of cellular services may lead to low prices for a third reason. Economic models predict there may be gains to pricing aggressively in industries characterized by significant learning economies. By keeping its prices low, a firm can increase production and achieve cost savings more rapidly as it moves down its learning curve.¹⁷ These models predict that economic performance will be better if, instead of many small firms, the industry consists of a few large, long-run profit-maximizing firms. The predictions of such models are supported by experiences in the semiconductor and related electronics industries.¹⁸

The history of the players' competitive behavior shapes their future behavior as well.¹⁹ Early in the history of cellular services, when the wireline carriers already were established and the nonwireline carriers were just beginning to serve customers, the new providers had an especially strong incentive to initiate price cuts. While they would realize lower revenue from their

¹⁶J.J. Rotemberg and G. Saloner, "A Supergame-Theoretic Model of Price Wars During Booms," American Economic Review 76 (1986), pp. 390-407.

¹⁷A.M. Spence, "The Learning Curve and Competition," The Bell Journal of Economics 12 (1981), pp. 49-70.

¹⁸F.M. Scherer and D. Ross, Industrial Market Structure and Economic Performance, Third Edition, (Boston, MA: Houghton Mifflin Co., 1990), pp. 373-374.

¹⁹Posner, op. cit., p. 61.

small bases of existing customers, this would be more than offset by revenues from the new customers they were able to attract.²⁰ The newer providers of long-distance telephone service faced similar incentives to price competitively against AT&T. Competition in the provision of long-distance service is considered by many to have increased significantly when start-up firms began offering service alternatives to AT&T, despite the fact that the structure of the industry is still quite concentrated.

Nor does it appear that the cellular service industry has established stable market-sharing arrangements as the nonwireline carriers' shares have grown to a substantial size. An example of shifting market shares is seen in Detroit. In that market in 1987, PacTel and Ameritech had 51.2 and 48.8 percent of the subscriber base, respectively. An industry analyst estimated that at year end in 1991, Pactel's share had fallen to 40.5 percent, and Ameritech's had risen to 59.5 percent.²¹

A final characteristic of cellular service markets that weakens industry cohesion, and thus the ability of firms to raise prices, is the heterogeneity of product offerings. Although the quality of airtime may not vary significantly across providers, an array of service packages typically is offered, none of which may

²⁰The Department of Justice and Federal Trade Commission Merger Guidelines of April 2, 1992 (p. 40) state that incentives to cheat on collusive agreements are greater the larger the proportional increase in sales from cheating and the smaller the base of sales prior to cheating.

²¹From Press Release, "Shosteck Releases Cellular Market Quarterly Review — Shows Cellular Sales and Subscriber Counts for Each Major Market," Silver Spring, Maryland, May 25, 1992, p. 3.

be directly comparable between competing providers.²² The lack of an obvious basis for comparing service prices increases the cost of monitoring and punishing deviations from any collusive agreement in the short term.²³ With the introduction of Personal Communications Services (PCS), product heterogeneity will increase, and the cost of monitoring a collusive agreement will increase because price changes that reflect differences in service quality will be difficult to distinguish from price changes that undercut a tacit agreement.

The feature of the cellular industry that is most likely to raise competitive concerns among economists is the existence of a government-mandated barrier to further entry. The threat of entry in response to a profit opportunity should incumbents set artificially high prices often may have a dampening effect on the prices that are observed.²⁴ Ease of entry is a powerful competitive force²⁵ that cellular providers have not had to confront. However, with the advent of PCS, together with the introduction of a number of new service providers, cellular operators may be subject to additional competitive discipline.

²²The quality of airtime will vary from time to time, however, if cellular providers fail to anticipate the growth in subscribers, leading to increased traffic congestion.

²³K.W. Clarkson, and R.L. Miller, Industrial Organization: Theory, Evidence, and Public Policy (New York, NY: McGraw-Hill Book Company, 1982), pp. 335-336.

²⁴F. Modigliani, "New Developments on the Oligopoly Front," Journal of Political Economy 66 (1958), pp. 215-232.

²⁵Posner, op. cit., p. 49.

The nature of transactions in cellular services tends to favor the stability of an industry agreement not to compete, although industry practices indicate that a "repeat-purchase" aspect of the cellular subscriber may dominate. In effect, cellular providers compete for a particular customer each month, since the cost of switching to the alternate supplier is minimal.²⁶ Frequent and small transactions diminish the gains from deviating from a collusive agreement and provide ample opportunity for retaliation against suppliers that do so.²⁷ However, the incentives offered consumers for initial subscriptions and the commissions paid to agents, which are determined by the expected lifetime of a subscription, represent an investment on the part of cellular providers. These investments signify that cellular providers expect an ongoing relationship with most customers.²⁸ To the extent subscribers represent a long-term stream of future monthly revenues, cellular service providers have an incentive to compete aggressively for new customers.²⁹

The role of capacity in cellular services also has an ambiguous impact on the likelihood of sustained collusive behavior.

²⁶The activation fee typically is waived when a subscriber switches to the other provider. The phone must be brought in for reprogramming, however.

²⁷Stigler, op. cit., pp. 47 and 51.

²⁸On average, 15 percent of a cellular carrier's subscribers switch to the other provider during the course of a year, an observation made by Thomas E. Wheeler, the President of the CTIA, in a speech on October 21, 1992, entitled "The Wireless Century," p. 4.

²⁹Stigler, op. cit., p. 51.

The capacity to serve subscribers increases in "lumpy" increments due to the nature of the technology. After the addition of new capacity, providers can serve new subscribers at low marginal cost. This scenario creates some pressure to undercut noncompetitive prices. On the other hand, economists recognize that idle capacity held by a price leader may serve to enforce collusive agreements.³⁰ The enforcement mechanism is the threat that the firm with significant excess capacity can flood the market with product to punish firms that undercut the noncompetitive price. However, economists tend to view excess capacity as a more important factor in industries experiencing cyclical or permanent downturns, a condition inapplicable to the past or foreseeable future of the cellular industry.

Economists recognize that an assessment of the degree of market competition must look beyond the number and size distribution of firms to factors that impede or foster collusive behavior. Clearly, there are characteristics of the cellular industry discouraging collusion and factors facilitating its practice. These characteristics by themselves are too complex to predict the competitive outcome. However, the observed performance in the cellular industry, most notably the rapid growth of the subscriber base and the steady decline in service prices, is consistent with competitive behavior.

³⁰Department of Justice and Federal Trade Commission Merger Guidelines, April 2, 1992, p. 40, footnote 19.